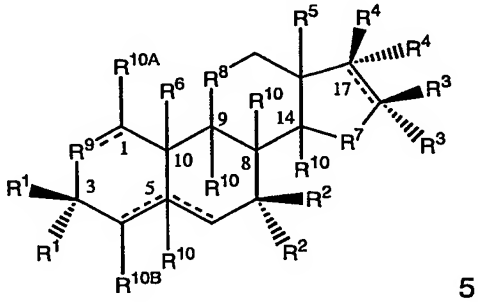
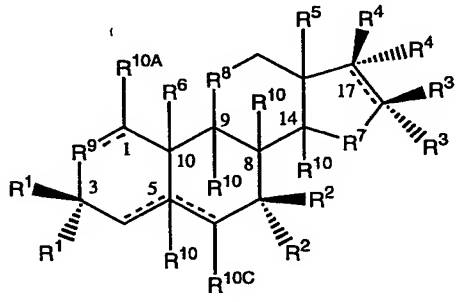
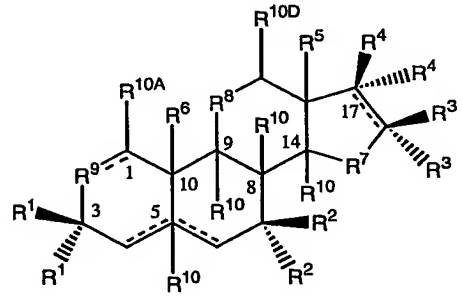
CLAIMS

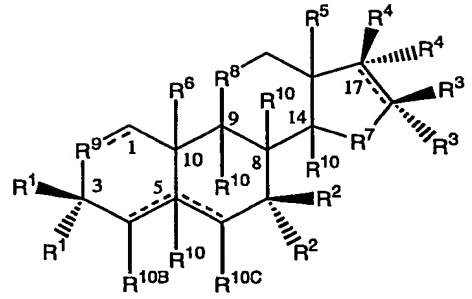
[00932] What is claimed is:

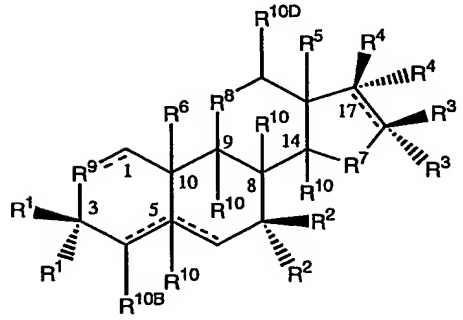
[00933] 1. A method to prevent, treat, ameliorate or slow the progression of cystic fibrosis, autism, sickle cell disease, neutropenia or thrombocytpoenia in a subject, or to treat a symptom of the neutropenia or thrombocytopenia, comprising administering to a subject, or delivering to the subject's tissues, an effective amount of a formula 1 compound having the structure 5, 6, 7, 8, 9, 10, 11, 12, 13 or 14

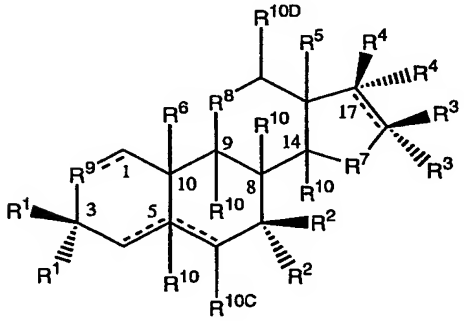
[00934]  5,

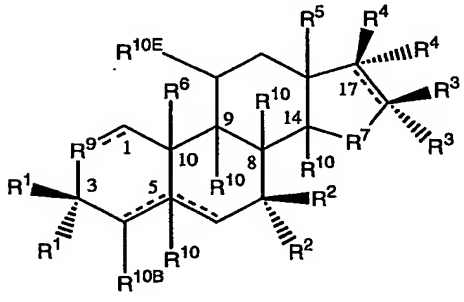
[00935]  6,

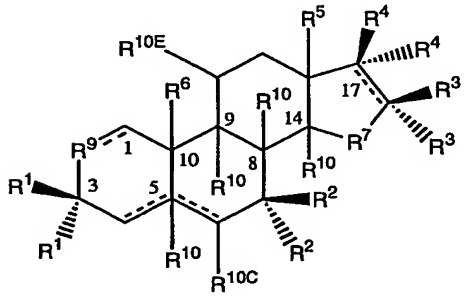
[00936]  7,

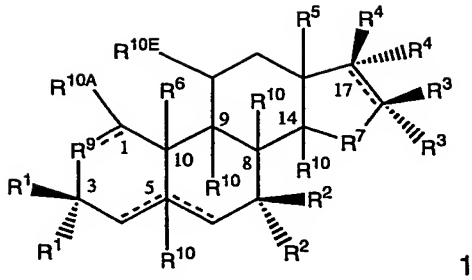
[00937]  8,

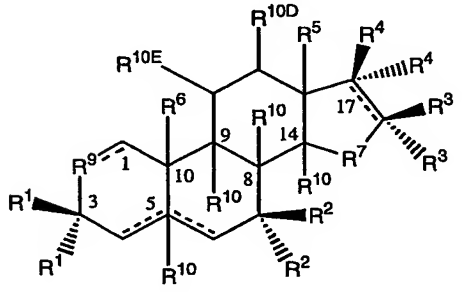
[00938]  9,

[00939]  10,

[00940]  11,

[00941]  12,

[00942]  13 or

[00943]  14,

[00944] or a salt, metabolic precursor or a metabolite thereof, wherein

[00945] R^{10} moieties at the 5 (if present), 8, 9 and 14 positions respectively are in the α,α,α,α, α,α,α,β, α,α,β,α, α,β,α,α, β,α,α,α, α,α,β,β, α,β,α,β, β,α,α,β, β,α,β,α, β,β,α,α, α,β,β,α, α,β,β,β, β,α,β,β, β,β,α,β, β,β,β,α or β,β,β,β configurations,

[00946] wherein R^{10A}, R^{10B}, R^{10C}, R^{10D} and R^{10E} respectively are in the α,α, α,β, β,α or β,β configurations,

[00947] wherein, each R^1, R^2, R^3, R^4, R^5, R^6, R^{10}, R^{10A}, R^{10B}, R^{10C}, R^{10D} and R^{10E} independently are -H, -OH, $-OR^{PR}$, $-SR^{PR}$, $-N(R^{PR})_2$, $-O-Si-(R^{13})_3$, -CHO, -CHS, -CN, -SCN, $-NO_2$, $-NH_2$, -COOH, $-OSO_3H$, $-OPO_3H$, an ester, a thioester, a thionoester, a phosphoester, a phosphothioester, a phosphonoester, a phosphiniester, a sulfite ester, a sulfate ester, an amide, an amino acid, a peptide, an ether, a thioether, an acyl group, a thioacyl group, a carbonate, a carbamate, a halogen, an optionally substituted alkyl group, an optionally substituted alkenyl group, an optionally substituted alkynyl group, an optionally substituted aryl moiety, an optionally substituted heteroaryl moiety, an optionally substituted heterocycle, an optionally substituted monosaccharide, an optionally substituted oligosaccharide, a nucleoside, a nucleotide, an oligonucleotide, a polymer, or,

[00948] one more of R^1, R^2, R^3, R^4, R^5, R^6, R^{10}, R^{10A}, R^{10B}, R^{10C}, R^{10D} and R^{10E} are =O, =S, =N-OH, $=CH_2$, $=CH-CH_3$, or an independently selected spiro ring and the hydrogen atom or the second variable group that is bonded to the same carbon atom is absent, or,

[00949] one or more of two adjacent R^1-R^6, R^{10}, R^{10A}, R^{10B}, R^{10C}, R^{10D} and R^{10E} comprise an independently selected epoxide, acetal, a thioacetal, ketal or thioketal;

[00950] R^7 is $-C(R^{10})_2-$, $-C(R^{10})_2-C(R^{10})_2-$, $-C(R^{10})_2-C(R^{10})_2-C(R^{10})_2-$, $-C(R^{10})_2-O-C(R^{10})_2-$, $-C(R^{10})_2-S-C(R^{10})_2-$, $-C(R^{10})_2-NR^{PR}-C(R^{10})_2-$, $-O-$, $-O-C(R^{10})_2-$, $-S-$, $-S-C(R^{10})_2-$, $-NR^{PR}-$ or $-NR^{PR}-C(R^{10})_2-$;

[00951] R^8 and R^9 independently are $-C(R^{10})_2-$, $-C(R^{10})_2-C(R^{10})_2-$, $-O-$, $-O-C(R^{10})_2-$, $-S-$, $-S-C(R^{10})_2-$, $-NR^{PR}-$ or $-NR^{PR}-C(R^{10})_2-$, or one or both of R^8 or R^9 independently are absent, leaving a 5-membered ring;

[00952] R^{13} independently is C_{1-6} alkyl; and

[00953] R^{PR} independently is -H or a protecting group, provided that (1) one R^4 is $-NH_2$, an opotionally substituted amine, $-N(R^{PR})^2$, =NOH, =NO-optionally substituted alkyl, an amide or an N-linked amino acid, or (2) the condition is cystic fibrosis or a sickle cell disease.

[00954] 2. The method of claim 1 wherein one each of R^1, R^2, R^3 and R^4 are -H, and, when no double bond links the second R^1, R^2, R^3 and R^4 to the ring to which it is bonded and no double bond is present at the 16-17 position, then the second R^1, R^2, R^3 and R^4 respectively are in the α,α,α,α, α,α,α,β, α,α,β,α, α,β,α,α, β,α,α,α, α,α,β,β, α,β,α,β, β,α,α,β, β,α,β,α, β,β,α,α, α,β,β,α, α,β,β,β, β,α,β,β, β,β,α,β, β,β,β,α o r β,β,β,β configurations and the second R^1, R^2, R^3 and R^4 are optionally independently selected from -H, -F, -Cl, -Br, -I, -OH, -SH, $-NH_2$, -COOH, $-CH_3$, $-C_2H_5$, $-C(CH_3)_3$, $-OCH_3$, $-OC_2H_5$, $-CF_3$, $-CH_2OH$, $-C(O)CH_3$, $-C(O)CH_2OH$, $-C(O)CH_2F$, $-C(O)CH_2Cl$, $-C(O)CH_2Br$, $-C(O)CH_2I$, $-C(O)CF_3$, $-C_2F_5$, =O, $=CH_2$, $=CHCH_3$, amino acid, carbamate, carbonate, optionally substituted C1-C20 alkyl, optionally substituted C1-C20 ether, optionally substituted C1-C20 ester, optionally substituted C1-C20 thioether, optionally substituted C1-C20 thioester, optionally substituted monosaccharide, optionally substituted disaccharide, optionally substituted oligosaccharide.

[00955] 3. The method of claim 1 or 2 wherein

[00956] (a) R^{10A} is bonded to the ring to which it is attached by a single bond and a double bond is present at (i) the 1-2 position, or (ii) the 1-2 and 16-17 positions; or

[00957] (b) R^{10B} is bonded to the ring to which it is attached by a single bond and a double bond is present at the 4-5 position; or

[00958] (c) R^{10c} is bonded to the ring to which it is attached by a single bond and a double bond is present at the 5-6 position; or

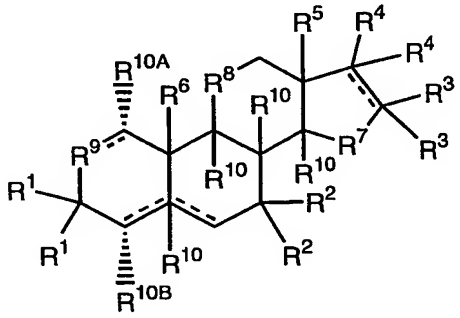
[00959] (d) R^{10A} and R^{10B} are bonded to the rings to which they are attached by a single bond and a double bond is present at (i) the 1-2 and 4-5 positions, or (ii) the 1-2, 4-5 and 16-17 positions;

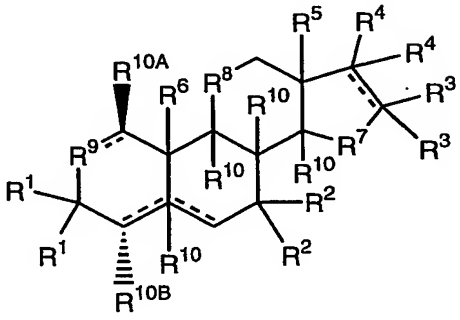
[00960] (e) R^{10A} and R^{10C} are bonded to the rings to which they are attached by a single bond and a double bond is present at (i) the 1-2 and 5-6 positions, or (ii) the 1-2, 5-6 and 16-17 positions; or

[00961] (f) no double bond is present.

[00962] 4. The method of claim 1, 2 or 3 wherein the compounds of structure 5, 6, 7, 8, 9, 10, 11 and 12 have the structure

[00963]





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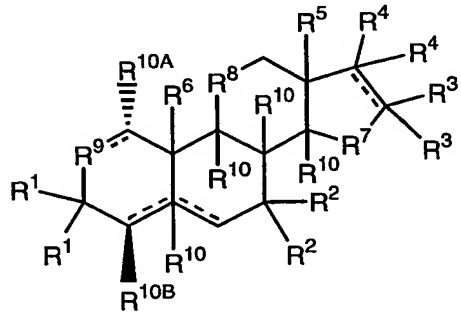

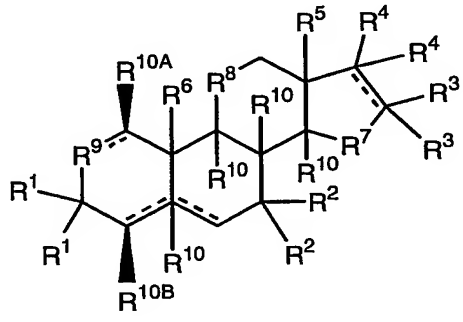

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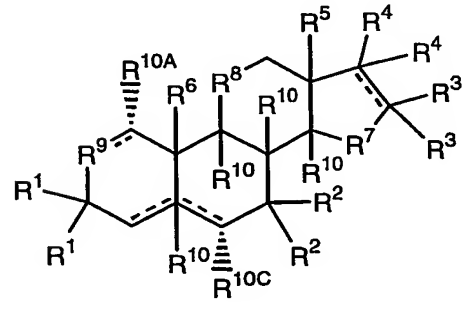

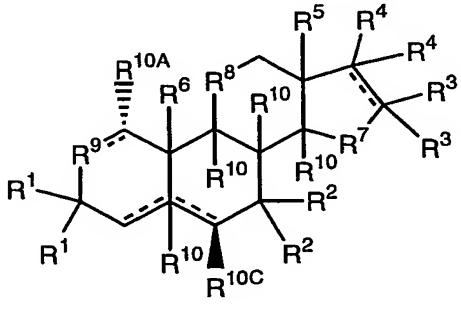

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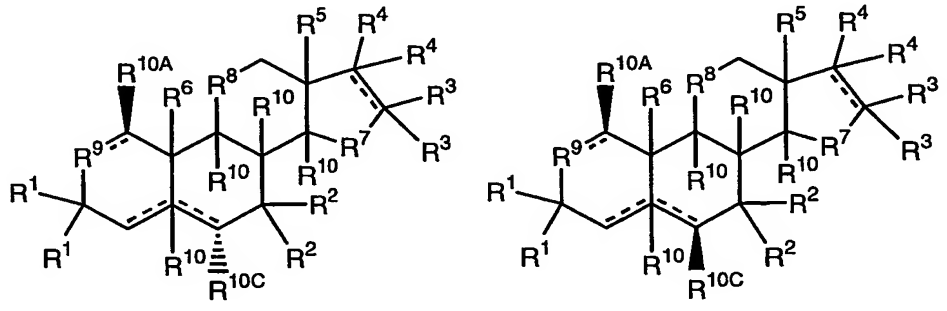

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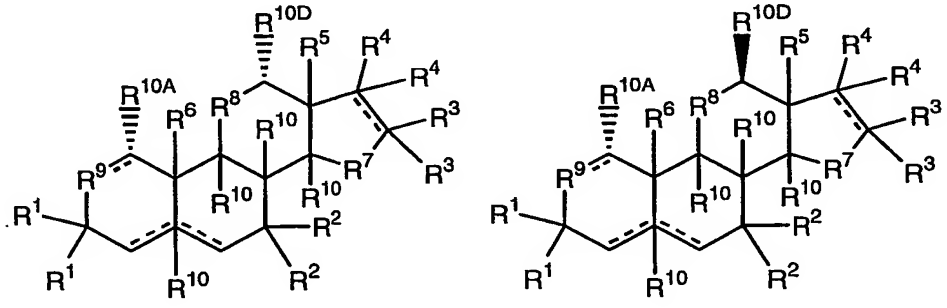

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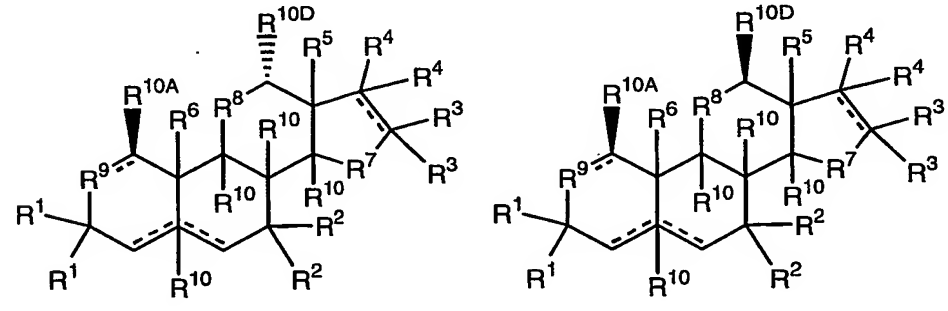

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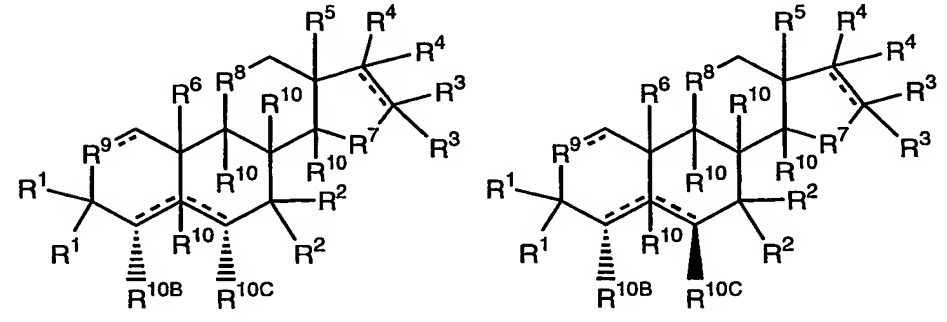
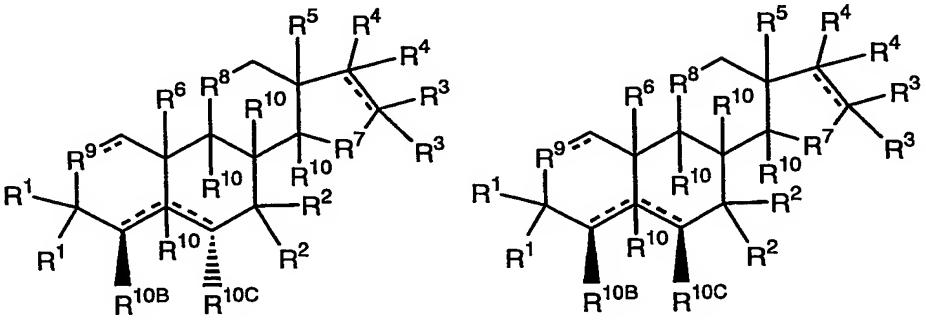
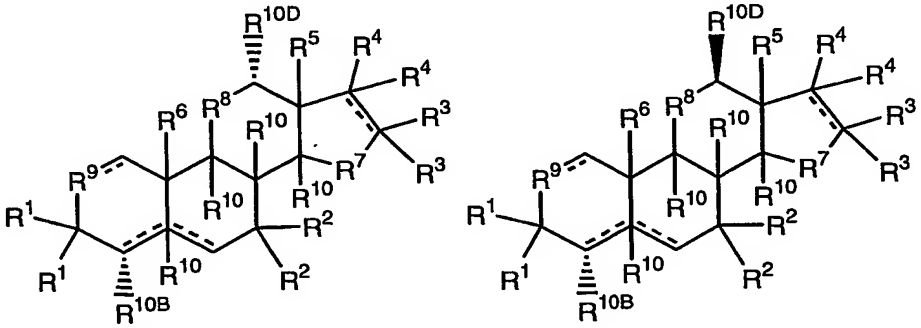
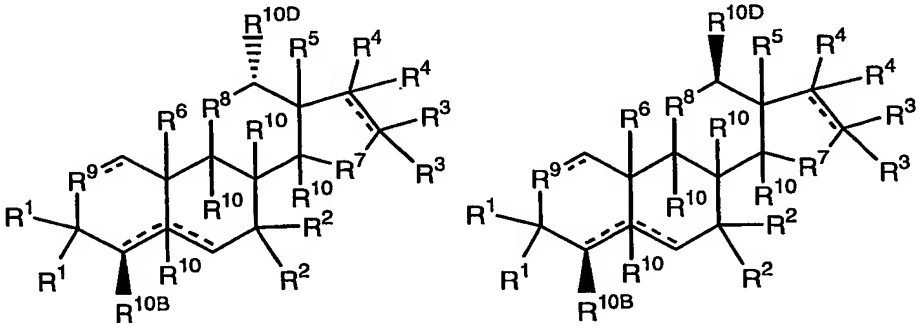
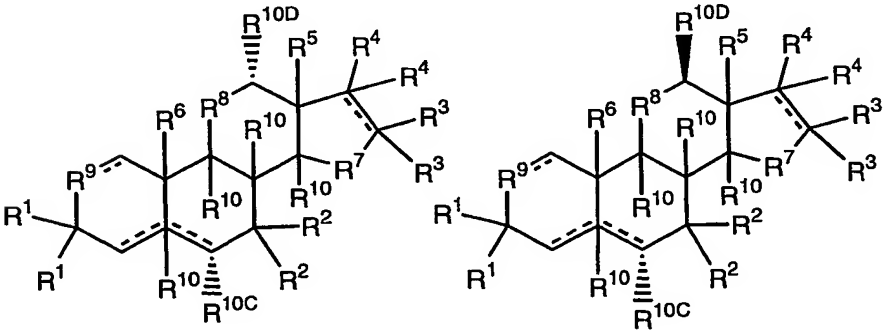


[00970] 

[00971] 

[00972] 

[00973] 

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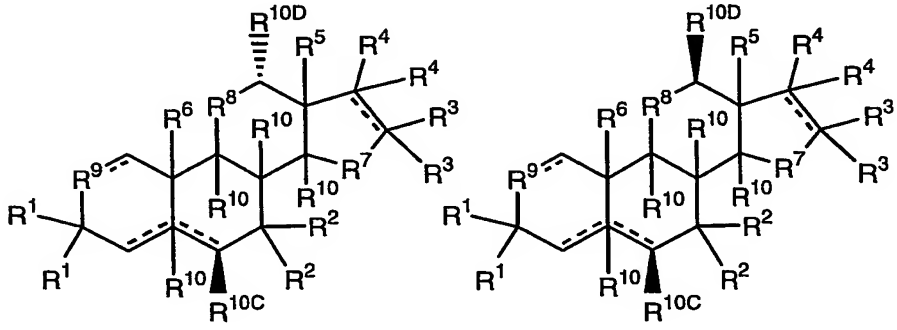

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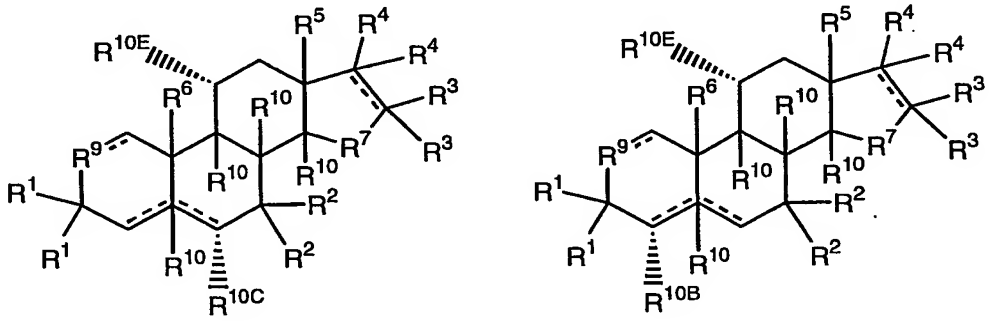

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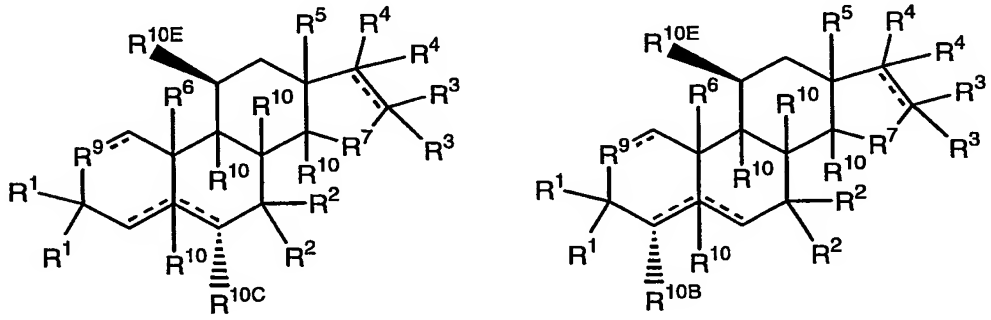

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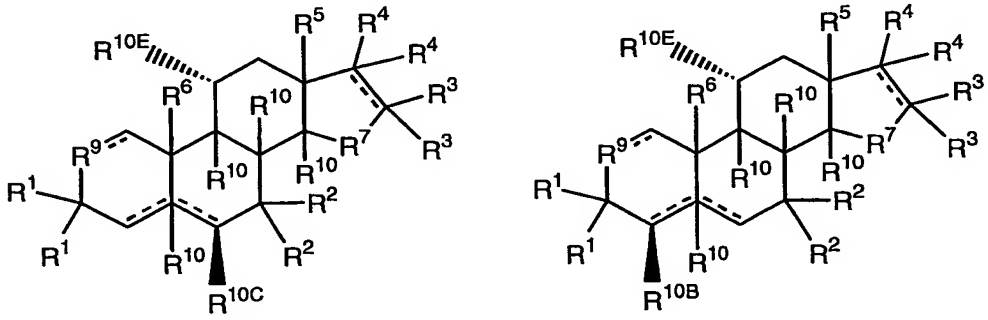
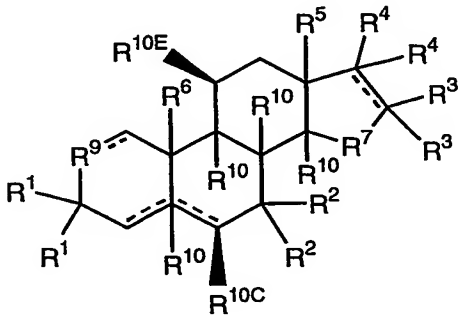
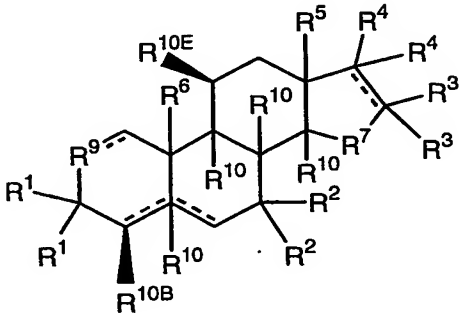


[00978]  

[00979] provided that if a double bond is present at the 1-2, 4-5 or 5-6 positions, then R^{10A}, R^{10B} or R^{10C} respectively are bonded to the ring to which they are linked by a single bond.

[00980] 5. The method of claim 1, 2, 3 or 4 wherein (1) R^5 and R^6 respectively are in the α,α, α,β, β,α or β,β configuration and R^5 and R^6 are optionally both $-CH_3$ or are optionally selected from $-CH_3$ and $-CH_2OH$ or (2) R^5 and R^6 are both in the β-configuration and R^5 and R^6 are optionally both $-CH_3$ or are optionally $-CH_3$ and $-CH_2OH$.

[00981] 6. The method of any of claims 1 through 5 wherein R^{10} at the 5, 8, 9 and 14-positions respectively are

[00982] (1) -H, -H, -H, -H;

[00983] (2) -H, -H, halogen (-F, -Cl, -Br or -I), -H;

[00984] (3) -H, -H, -H, -OH;

[00985] (4) -H, -H, halogen (-F, -Cl, -Br or -I), -OH;

[00986] (5) -optionally substituted alkyl (e.g., $-CH_3$, $-CH_2OH$, $-CH_2O$-ester, $-C_2H_5$), -H, -H, -H;

[00987] (6) -optionally substituted alkyl (e.g., $-CH_3$, $-CH_2OH$, $-CH_2O$-ester, $-C_2H_5$), -H, halogen (-F, -Cl, -Br or -I), -H;

[00988] (7) -optionally substituted alkyl (e.g., $-CH_3$, $-CH_2OH$, $-CH_2O$-ester, $-C_2H_5$), -H, -H, -OH;

[00989] (8) -acyl (e.g., $-C(O)-(CH_2)_{0-2}-CH_3$), -H, -H, -H;

[00990] (9) -ester (e.g., acetoxy or propionoxy), -H, -H, -H;

[00991] (10) -ether (e.g., $-O-(CH_2)_{0-2}-CH_3$), -H, -H, -H;

[00992] (11) -ester (e.g., acetoxy, propionoxy, $-O-C(O)-(CH_2)_{1-6}-H$), -H, halogen (e.g., -F, -Cl, -Br), -H;

[00993] (12) -ester (e.g., acetoxy or propionoxy), -H, -H, -OH;

[00994] (13) -H, -H, -H, -acyl (e.g., $-C(O)-(CH_2)_{0-2}-CH_3$);

[00995] (14) -H, -H, -H, -ester (e.g., acetoxy or propionoxy); or

[00996] (15) -H, -H, -H, -ether (e.g., $-O-(CH_2)_{0-2}-CH_3$, $-OCH_3$, $-OC_2H_5$, $-OCH_2OH$, $-OCH_2F$, $-OCH_2Br$, $-OCH_2COOH$, $-OCH_2NH_2$, $-OCH_2CH_2OH$, $-OCH_2CH_2F$, $-OCH_2CH_2Br$, $-OCH_2CH_2COOH$ or $-OCH_2CH_2NH_2$).

[00997] 7. The method of any of claims 1 through 6 wherein R^7 is $-CH_2-$, -CHOH-, $-CH(\alpha R^{10})-$, -CH(ester)-, -CH(alkoxy)- or -CH(halogen)- where the hydroxyl, ester or alkoxy group or the halogen atom is present in the α-configuration and the alkoxy group is optionally selected from $-OCH_3$, $-OC_2H_5$ and $-OC_3H_7$ and the halogen atom is -F, -Cl, -Br or -I.

[00998] 8. The method of any of claims 1 through 7 wherein R^8 is $-CH_2-$, $-CF_2-$, -CHOH-, $-CH(\alpha R^{10})-$, -CH(ester)-, -CH(alkoxy)- or -CH(halogen)- where the hydroxyl, ester or alkoxy group or the halogen atom is present in the α-configuration and the alkoxy group is optionally selected from $-OCH_3$, $-OC_2H_5$ and $-OC_3H_7$ and the halogen atom is -F, -Cl, -Br or -I.

[00999] 9. The method of claim 1 wherein the formula 1 compound is 16α-bromo-3β-hydroxy-5α-androstan-17-one, 16α-fluoro-3β-hydroxy-5α-androstan-17-one, 16α-chloro-3β-hydroxy-5α-androstan-17-one, 16β-bromo-3β-hydroxy-5α-androstan-17-one, 16β-fluoro-3β-hydroxy-5α-androstan-17-one, 16β-chloro-3β-hydroxy-5α-androstan-17-one, 16α,3β-dihydroxy-5α-androstan-17-one, 16β,3β-dihydroxy-5α-androstan-17-one, 16α,3α-dihydroxy-5α-androstan-17-one, 16β,3α-dihydroxy-5α-androstan-17-one, 16α-bromo-3β-hydroxy-5α-androstan-17-one hemihydrate, 3α-hydroxy-16α-fluoroandrostane-17-one, 3β-hydroxy-16α-fluoroandrostane-17-one, 17α-hydroxy-16α-fluoroandrostane-3-one, 17β-hydroxy-16α-fluoroandrostane-3-one, 17α-hydroxy-16α-fluoroandrostane-4-one, 17β-hydroxy-16α-fluoroandrostane-4-one, 17α-hydroxy-16α-fluoroandrostane-6-one, 17β-hydroxy-16α-fluoroandrostane-6-one, 17α-hydroxy-16α-fluoroandrostane-7-one, 17β-hydroxy-16α-fluoroandrostane-7-one, 17α-hydroxy-16α-fluoroandrostane-11-one, 17β-hydroxy-16α-fluoroandrostane-11-one, 16α-fluoroandrost-5-ene-17-one, 7α-hydroxy-16α-fluoroandrost-5-ene-17-one, 7β-hydroxy-16α-fluoroandrost-5-ene-17-one, 4α-hydroxy-16α-fluoroandrost-5-ene-17-one, 3α-hydroxy-16α-fluoroandrost-5-ene-17-one, 3β-hydroxy-16α-fluoroandrost-5-ene-17-one,4β-hydroxy-16α-fluoroandrost-5-ene-17-one, 6α-hydroxy-16α-

fluoroandrost-5-ene-17-one, 6β-hydroxy-16α-fluoroandrost-5-ene-17-one, 11α-hydroxy-16α-fluoroandrost-5-ene-17-one, 11β-hydroxy-16α-fluoroandrost-5-ene-17-one, 4α,17β-dihydroxy-16α-fluoroandrost-5-ene, 4β,17β-dihydroxy-16α-fluoroandrost-5-ene, 6α,17β-dihydroxy-16α-fluoroandrost-5-ene, 6β,17β-dihydroxy-16α-fluoroandrost-5-ene, 11α,17β-dihydroxy-16α-fluoroandrost-5-ene, 11β,17β-dihydroxy-16α-fluoroandrost-5-ene, 4α,17α-dihydroxy-16α-fluoroandrost-5-ene, 4β,17α-dihydroxy-16α-fluoroandrost-5-ene, 6α,17α-dihydroxy-16α-fluoroandrost-5-ene, 6β,17α-dihydroxy-16α-fluoroandrost-5-ene, 11α,17α-dihydroxy-16α-fluoroandrost-5-ene, 11β,17α-dihydroxy-16α-fluoroandrost-5-ene, 7α,17β-dihydroxy-16α-fluoroandrost-5-ene, 7β,17β-dihydroxy-16α-fluoroandrost-5-ene, 3α,17β-dihydroxy-16α-fluoroandrost-5-ene, 3β,17β-dihydroxy-16α-fluoroandrost-5-ene, 3α,17α-dihydroxy-16α-fluoroandrost-5-ene, 3β,17α-dihydroxy-16α-fluoroandrost-5-ene, 1α,17β-dihydroxy-16α-fluoroandrost-5-ene, 1β,17β-dihydroxy-16α-fluoroandrost-5-ene, 2α,17β-dihydroxy-16α-fluoroandrost-5-ene, 2β,17β-dihydroxy-16α-fluoroandrost-5-ene, 12α,17β-dihydroxy-16α-fluoroandrost-5-ene, 12β,17β-dihydroxy-16α-fluoroandrost-5-ene, 1α,17α-dihydroxy-16α-fluoroandrost-5-ene, 1β,17α-dihydroxy-16α-fluoroandrost-5-ene, 2α,17α-dihydroxy-16α-fluoroandrost-5-ene, 2β,17α-dihydroxy-16α-fluoroandrost-5-ene, 12α,17α-dihydroxy-16α-fluoroandrost-5-ene, 12β,17α-dihydroxy-16α-fluoroandrost-5-ene, 15α,17β-dihydroxy-16α-fluoroandrost-5-ene, 15β,17β-dihydroxy-16α-fluoroandrost-5-ene, 17β,18-dihydroxy-16α-fluoroandrost-5-ene, 17β,19-dihydroxy-16α-fluoroandrost-5-ene, 15α,17α-dihydroxy-16α-fluoroandrost-5-ene, 15β,17α-dihydroxy-16α-fluoroandrost-5-ene, 17α,18-dihydroxy-16α-fluoroandrost-5-ene, 17α,19-dihydroxy-16α-fluoroandrost-5-ene, 16α-fluoroandrost-4-ene-17-one, 7α-hydroxy-16α-fluoroandrost-4-ene-17-one, 7β-hydroxy-16α-fluoroandrost-4-ene-17-one, 3α-hydroxy-16α-fluoroandrost-4-ene-17-one, 3β-hydroxy-16α-fluoroandrost-4-ene-17-one, 4α-hydroxy-16α-fluoroandrost-4-ene-17-one, 4β-hydroxy-16α-fluoroandrost-4-ene-17-one, 6α-hydroxy-16α-fluoroandrost-4-ene-17-one, 6β-hydroxy-16α-fluoroandrost-4-ene-17-one, 11α-hydroxy-16α-fluoroandrost-4-ene-17-one, 11β-hydroxy-16α-fluoroandrost-4-ene-17-one, 4α,17β-dihydroxy-16α-fluoroandrost-4-ene, 4β,17β-dihydroxy-16α-fluoroandrost-4-ene, 6α,17β-dihydroxy-16α-fluoroandrost-4-ene, 6β,17β-dihydroxy-16α-fluoroandrost-4-ene, 11α,17β-dihydroxy-16α-fluoroandrost-4-ene,

11β,17β-dihydroxy-16α-fluoroandrost-4-ene, 4α,17α-dihydroxy-16α-fluoroandrost-4-ene, 4β,17α-dihydroxy-16α-fluoroandrost-4-ene, 6α,17α-dihydroxy-16α-fluoroandrost-4-ene, 6β,17α-dihydroxy-16α-fluoroandrost-4-ene, 11α,17α-dihydroxy-16α-fluoroandrost-4-ene, 11β,17α-dihydroxy-16α-fluoroandrost-4-ene, 7α,17β-dihydroxy-16α-fluoroandrost-4-ene, 7β,17β-dihydroxy-16α-fluoroandrost-4-ene, 3α,17β-dihydroxy-16α-fluoroandrost-4-ene, 3β,17β-dihydroxy-16α-fluoroandrost-4-ene, 3α,17α-dihydroxy-16α-fluoroandrost-4-ene, 3β,17α-dihydroxy-16α-fluoroandrost-4-ene, 1α,17β-dihydroxy-16α-fluoroandrost-4-ene, 1β,17β-dihydroxy-16α-fluoroandrost-4-ene, 2α,17β-dihydroxy-16α-fluoroandrost-4-ene, 2β,17β-dihydroxy-16α-fluoroandrost-4-ene, 12α,17β-dihydroxy-16α-fluoroandrost-4-ene, 12β,17β-dihydroxy-16α-fluoroandrost-4-ene, 1α,17α-dihydroxy-16α-fluoroandrost-4-ene, 1β,17α-dihydroxy-16α-fluoroandrost-4-ene, 2α,17α-dihydroxy-16α-fluoroandrost-4-ene, 2β,17α-dihydroxy-16α-fluoroandrost-4-ene, 12α,17α-dihydroxy-16α-fluoroandrost-4-ene, 12β,17α-dihydroxy-16α-fluoroandrost-4-ene, 15α,17β-dihydroxy-16α-fluoroandrost-4-ene, 15β,17β-dihydroxy-16α-fluoroandrost-4-ene, 17β,18-dihydroxy-16α-fluoroandrost-4-ene, 17β,19-dihydroxy-16α-fluoroandrost-4-ene, 15α,17α-dihydroxy-16α-fluoroandrost-4-ene, 15β,17α-dihydroxy-16α-fluoroandrost-4-ene, 17α,18-dihydroxy-16α-fluoroandrost-4-ene, 17α,19-dihydroxy-16α-fluoroandrost-4-ene, 3β,17β-dihydroxyandrost-5-ene, 3β-hydroxy-7,17-dioxoandrost-5-ene, 3α-hydroxy-7,17-dioxoandrost-5-ene, 3,17-dioxoandrost-5-ene, 3,17-dioxoandrost-4-ene, 3,17-dioxoandrost-1,4-diene, 3β,7β,17β-trihydroxyandrost-5-ene, 3β,7β,17β-trihydroxyandrostane, 3β,16α-dihydroxy-17-oxoandrostane, 3α,16α-dihydroxy-17-oxoandrostane, 3β,16β-dihydroxy-17-oxoandrostane, 3α,16β-dihydroxy-17-oxoandrostane, 3β,16α,17β-trihydroxyandrostane, 3β,16β,17β-trihydroxyandrostane, 3β,16α,17α-trihydroxyandrostane, 3β,16β,17α-trihydroxyandrostane, 3α,16α,17β-trihydroxyandrostane, 3α,16β,17β-trihydroxyandrostane or an analog of any of the foregoing compounds that is suitably substituted to fall within the scope of the claim, e.g., wherein an R^{10} is a hydroxyl, thiol, optionally substituted alkyl or a halogen such as fluorine or bromine at the 1-, 2-, 4-, 6-, 7-, 9- 11-, 12-, 14-, 15- or 16-position, wherein the R^{10} is present in the α-configuration or the β-configuration.

[001000] 10. The method of any of claims 1 through 9 wherein the subject has, or is subject or susceptible to developing, neutropenia.

[001001] 11. The method of claim 10 wherein the subject is a human and wherein the neutropenia is postinfectious neutropenia, autoimmune neutropenia, chronic idiopathic neutropenia or a neutropenia resulting from or potentially resulting result from a cancer chemotherapy, chemotherapy for an autoimmune disease, an antiviral therapy, radiation exposure, tissue or solid organ allograft or xenograft rejection or immune suppression therapy in tissue or solid organ transplantation or aging or immunesenescence.

[001002] 12. The method of claim 10 or 11 wherein one R^4 is in the β-configuration or the α-configuration and is $-NH_2$, a substituted amine or an amide, which is optionally selected from $-NH_2$, $-NHCH_3$, $-N(CH_3)_2$, $-NHR^{PR}$, -NH-C(O)-H and -NH-C(O)-optionally substituted alkyl, e.g., $-NH-C(O)-CH_3$.

[001003] 14. The method of claim 11 wherein the formula 1 compound is 3β-hydroxy-17β-aminoandrost-5-ene, 3β-hydroxy-16α-fluoro-17β-aminoandrost-5-ene, 3β-hydroxy-16β-fluoro-17β-aminoandrost-5-ene, 3β-hydroxy-16,16-difluoro-17β-aminoandrost-5-ene, 3β,16α-dihydroxy-17β-aminoandrost-5-ene, 3β,16β-dihydroxy-17β-aminoandrost-5-ene, 3β-hydroxy-16,16-dimethyl-17β-aminoandrost-5-ene, an ester or carbonate of any of these compounds or an analog of any of the foregoing compounds where the double bond at the 5-6 position is absent and a hydrogen or other R^{10} moiety is present at the 5-position in the α- or β-configuration and/or wherein the hydroxyl group (or ester or carbonate analog) at the 3-position is present in the α-configuration.

[001004] 14. The method of claim 14 wherein the formula 1 compound is 3β-hydroxy-17β-aminoandrost-5-ene.

[001005] 15. The method of claim 1 wherein the subject is a human having cystic fibrosis.

[001006] 16. The method of claim 15, wherein one or more symptoms or syndromes are ameliorated, or wherein the progression of the disease is reduced.

[001007] 17. The method of claim 68, wherein the one or more symptoms or syndromes are 1, 2, 3 or more of *Staphylococcus* (e.g., *S. aureus*), *Haemophilus influenzae, Pseudomonas* or *Burkholderia* respiratory tract or lung infection or propensity to develop a detectable infection or colonization, coughing, wheezing, cyanosis, bronchiolitis, bronchospasm, pneumothorax, hemoptysis,

pancreatic exocrine insufficiency, bronchiectatic lung disease, atelectasis-consolidation, pulmonary edema, increased lung vascular hydrostatic pressure, increased lung vascular permeability, sinusitis, respiratory insufficiency, bronchial wall or interlobular septa thickening, reduction of forced expiratory volume in 1 second, dyspnea, impaired male fertility, elevated sweat chloride, mucous plugging, tree-in-bud sign, mosaic perfusion pattern, glucose intolerance or abnormal elevation of one or more of IL-4, IL-8, RANTES, neutrophil elastase, eosinophils, macrophages, neutrophils, eosinophil cationic protein or cysteinyl leukotrienes.

[001008] 18. The method of claim 15, 16 or 17 wherein the F1C is 16α-bromoepiandrosterone, 16α-bromoepiandrosterone hemihydrate, 16α-hydroxyepiandrosterone, 16β-hydroxyepiandrosterone, 3α,17β-dihydroxyandrostane, 3β,17β-dihydroxyandrostane, 3α,16α,17β-trihydroxyandrostane, 3α,16β,17β-trihydroxyandrostane, 3β,16α,17β-trihydroxyandrostane, 3β,16β,17β-trihydroxyandrostane, or an ester, carbonate or other analog of any of these compounds that can convert to the compound by metabolism or hydrolysis.

[001009] 19. A method to treat or to reduce the severity of a chronic allergy or an atopic disease, or one or more symptoms of the chronic allergy or atopic disease in a subject in need thereof, comprising administering an effective amount of a formula 1 compound of any of claims 1-9, wherein

[001010] one R^1 is, or both R^1 together are, -OH, $-OR^{PR}$, $-SR^{PR}$, $-O-Si-(R^{13})_3$, -COOH, $-OSO_3H$, $-OPO_3H$, =O, =S, an ester, a thioester, a thionoester, a phosphoester, a phosphothioester, a phosphonoester, a phosphiniester, a sulfite ester, a sulfate ester, an amide, an amino acid, a peptide, an ether, a thioether, a carbonate or a carbamate, and the other R^1 is independently chosen; and

[001011] one R^4 is, or both R^4 together are, -OH, $-OR^{PR}$, $-SR^{PR}$, $-N(R^{PR})_2$, $-O-Si-(R^{13})_3$, -CHO, -CHS, -CN, -SCN, $-NO_2$, $-NH_2$, -COOH, $-OSO_3H$, $-OPO_3H$, =O, =S, =N-OH, =N-O-optionally substituted alkyl, an ester, a thioester, a thionoester, a phosphoester, a phosphothioester, a phosphonoester, a phosphiniester, a sulfite ester, a sulfate ester, an amide, an amino acid, a peptide, an ether, a thioether, an acyl group, a thioacyl group, a carbonate or a carbamate, and the other R^4 is independently chosen.

[001012] 20. The method of claim 19 wherein the compound is 16α-bromoepiandrosterone, 16α-bromoepiandrosterone hemihydrate, 16α-iodoepiandrosterone, 16-oxoepiandrosterone, 16-oxoandrosterone, 3β,16α-dihydroxyandrostane-17-one, 3α,16α-dihydroxyandrostane-17-one, 3β,16β-dihydroxyandrostane-17-one, 3α,16β-dihydroxyandrostane-17-one, 3β,16α,17β-trihydroxyandrostane, 3α,16α,17β-trihydroxyandrostane, 3β,16β,17β-trihydroxyandrostane, 3α,16β,17β-trihydroxyandrostane, or an analog of any of these compounds that is (1) 2-oxa or 11-oxa substituted, (2) substituted at the 7-position with an α-halogen, β-halogen, α-hydroxyl, β-hydroxyl or oxo moiety, (3) a D-ring homo analog, (4) a 19-nor analog and/or (5) an analog of any of the foregoing compounds that is substituted with an R^{10} substituent disclosed herein, e.g., wherein the R^{10} is a hydroxyl, thiol, optionally substituted alkyl or a halogen such as fluorine or bromine at the 1-, 2-, 4-, 6-, 9- 11-, 12-, 14-, 15- or 16-positions, wherein the R^{10}, e.g., the hydroxyl, thiol, optionally substituted alkyl or halogen is present in the α-configuration or the β-configuration.

[001013] 21. The method of claim 19 or 20 wherein the level or activity of IgE in the subject is at least transiently detectably reduced.

[001014] 22. The method of claim 1 wherein the subject is a human who has a sickle cell disease.

[001015] 23. The method of claim 22 wherein the treatment reduces (1) the severity of pain during vascular or microvascular occlusions, (2) the severity of vascular or microvascular occlusions or (3) the frquency of vascular or microvascular occlusions.

[001016] 24. The method of claim 22 or 23 comprising intermittent administration of the formula 1 compound.

[001017] 25. The method of claim 22, 23 or 24 wherein one R^1 is, or both R^1 together are, -H, -OH, $-OR^{PR}$, $-SR^{PR}$, $-O-Si-(R^{13})_3$, -COOH, $-OSO_3H$, $-OPO_3H$, =O, =S, an ester, a thioester, a thionoester, a phosphoester, a phosphothioester, a phosphonoester, a phosphiniester, a sulfite ester, a sulfate ester, an amide, an amino acid, a peptide, an ether, a thioether, a carbonate or a carbamate, and the other R^1 is independently chosen; and

[001018] one R^4 is, or both R^4 together are, -OH, $-OR^{PR}$, $-SR^{PR}$, $-N(R^{PR})_2$, $-O-Si-(R^{13})_3$, -CHO, -CHS, -CN, -SCN, $-NO_2$, $-NH_2$, -COOH, $-OSO_3H$, $-OPO_3H$, =O, =S, =N-OH, =N-O-optionally substituted alkyl, an ester, a thioester, a thionoester,

a phosphoester, a phosphothioester, a phosphonoester, a phosphiniester, a sulfite ester, a sulfate ester, an amide, an amino acid, a peptide, an ether, a thioether, an acyl group, a thioacyl group, a carbonate or a carbamate, and the other R^4 is independently chosen.

[001019] 26. The method of claim 25 wherein the compound is 3β,17β-dihydroxyandrost-5-ene, 3β,7β,17β-trihydroxyandrost-5-ene, 3β,17β-dihydroxyandrost-1,5-diene, 3β,7β,17β-trihydroxyandrost-1,5-diene, 3β,17β-dihydroxy-16-haloandrost-5-ene, 3β,7β,17β-trihydroxy-16-haloandrost-5-ene, 16α-fluoro-17-oxoandrost-5-ene, 3α-hydroxy-16α-fluoro-17-oxoandrost-5-ene, 3β-hydroxy-16α-fluoro-17-oxoandrost-5-ene, 3β,17β-dihydroxy-16α-fluoroandrost-5-ene, 3α,17β-dihydroxy-16α-fluoroandrost-5-ene, 16α-bromoepiandrosterone, 16α-bromoepiandrosterone hemihydrate, 16α-iodoepiandrosterone, 16-oxoepiandrosterone, 16-oxoandrosterone, 3β,16α-dihydroxyandrostane-17-one, 3α,16α-dihydroxyandrostane-17-one, 3β,16β-dihydroxyandrostane-17-one, 3α,16β-dihydroxyandrostane-17-one, 3β,16α,17β-trihydroxyandrostane, 3α,16α,17β-trihydroxyandrostane, 3β,16β,17β-trihydroxyandrostane, 3α,16β,17β-trihydroxyandrostane, or an analog of any of these compounds that is (1) 11-oxa substituted or 2-oxa substituted if no double bond is present at the 1-2 position, (2) substituted at the 7-position with an α-halogen, β-halogen, α-hydroxyl, β-hydroxyl or oxo moiety, (3) a D-ring homo analog, (4) a 19-nor analog and/or (5) an analog of any of the foregoing compounds that is substituted with an R^{10} substituent disclosed herein, e.g., wherein the R^{10} is a hydroxyl, thiol, optionally substituted alkyl or a halogen such as fluorine or bromine at the 1-, 2-, 4-, 6-, 9- 11-, 12-, 14-, 15- or 16-positions, wherein the R^{10}, e.g., the hydroxyl, thiol, optionally substituted alkyl or halogen is present in the α-configuration or the β-configuration.

[001020] 27. A method to modulate the expression in a cell of the level of or an activity of 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 or more gene products or gene transcripts in the cell, comprising contacting an effective amount of the compound with the cell under suitable conditions and for a sufficient time to detectably modulate the activity or level of the genes, or gene products in the cell, wherein the compound is a compound of any of embodiments 1-9 and the gene products or gene transcripts are selected from USF1, c-Fos, EGR1, Cul1, RIPK2, IκBα, IκBKb, NF-κB1 p50, FCAR, c-Fos/ C/EBPβ, RANTES, ICAM1, TSG (TNFAIP6), IL-2 receptor α, GRO2, GRO3, HO1, Jun B, c-Fos/JunB complex, JunB/ATF3

complex, c-Jun, c-Fos/c-Jun complex, ATF-3, MMP1, TSG-6 (TNFAIP3), AP-1, EGR1, TGFβ, ATF-3/c-Jun complex, c-Fos, MMP3, IL-8, STAT5A, STAT5B, CDKN1A, IFNγ receptor 2 (IFNγR2), T-bet, C reactive protein, immunoglobulin E, an AP-1 family protein, GATA-3, Jak2, Tyk2, stat1, stat3, stat4, stat5, stat6, MIP-1α, MIP-2, IP-10, MCP-1, TNF-α, TNF-β, LT-β, IFN-α, IFN-β, TGF-β1, NF-κB, IL-1α, IL-1β, IL-4, IL-6, IL-10, IL-12 receptor β1, IL-12p35, IL-12p40, IL-23, IL-23 receptor, Nrf2, a Maf protein, a thioredoxin, NQO1, GST, HO 1, SOD2, the catalytic subunit of γGCS, the regulatory subunit of γGCS and xCT.

[001021] 28. The method of claim 27 wherein there is a detectable increase in the level of the mRNA, the protein or one or more biological activities associated with the gene product.

[001022] 29. The method of claim 27 or 28 wherein the formula 1 compound is 16α-bromo-3β-hydroxy-5α-androstan-17-one, 16α-bromo-3β-hydroxy-5α-androstan-17-one hemihydrate, 16α-fluoro-3β-hydroxy-5α-androstan-17-one, 16α-chloro-3β-hydroxy-5α-androstan-17-one, 16β-bromo-3β-hydroxy-5α-androstan-17-one, 16β-fluoro-3β-hydroxy-5α-androstan-17-one, 16β-chloro-3β-hydroxy-5α-androstan-17-one, 16α,3β-dihydroxy-5α-androstan-17-one, 16β,3β-dihydroxy-5α-androstan-17-one, 16α,3α-dihydroxy-5α-androstan-17-one, 16β,3α-dihydroxy-5α-androstan-17-one, 16α-bromo-3β-hydroxy-5α-androstan-17-one hemihydrate, 3α-hydroxy-16α-fluoroandrostane-17-one, 3β-hydroxy-16α-fluoroandrostane-17-one, 17α-hydroxy-16α-fluoroandrostane-3-one, 17β-hydroxy-16α-fluoroandrostane-3-one, 17α-hydroxy-16α-fluoroandrostane-4-one, 17β-hydroxy-16α-fluoroandrostane-4-one, 17α-hydroxy-16α-fluoroandrostane-6-one, 17β-hydroxy-16α-fluoroandrostane-6-one, 17α-hydroxy-16α-fluoroandrostane-7-one, 17β-hydroxy-16α-fluoroandrostane-7-one, 17α-hydroxy-16α-fluoroandrostane-11-one, 17β-hydroxy-16α-fluoroandrostane-11-one, 16α-fluoroandrost-5-ene-17-one, 7α-hydroxy-16α-fluoroandrost-5-ene-17-one, 7β-hydroxy-16α-fluoroandrost-5-ene-17-one, 4α-hydroxy-16α-fluoroandrost-5-ene-17-one, 3α-hydroxy-16α-fluoroandrost-5-ene-17-one, 3β-hydroxy-16α-fluoroandrost-5-ene-17-one,4β-hydroxy-16α-fluoroandrost-5-ene-17-one, 6α-hydroxy-16α-fluoroandrost-5-ene-17-one, 6β-hydroxy-16α-fluoroandrost-5-ene-17-one, 11α-hydroxy-16α-fluoroandrost-5-ene-17-one, 11β-hydroxy-16α-fluoroandrost-5-ene-17-one, 4α,17β-dihydroxy-16α-fluoroandrost-5-ene, 4β,17β-dihydroxy-16α-

fluoroandrost-5-ene, 6α,17β-dihydroxy-16α-fluoroandrost-5-ene, 6β,17β-dihydroxy-16α-fluoroandrost-5-ene, 11α,17β-dihydroxy-16α-fluoroandrost-5-ene, 11β,17β-dihydroxy-16α-fluoroandrost-5-ene, 4α,17α-dihydroxy-16α-fluoroandrost-5-ene, 4β,17α-dihydroxy-16α-fluoroandrost-5-ene, 6α,17α-dihydroxy-16α-fluoroandrost-5-ene, 6β,17α-dihydroxy-16α-fluoroandrost-5-ene, 11α,17α-dihydroxy-16α-fluoroandrost-5-ene, 11β,17α-dihydroxy-16α-fluoroandrost-5-ene, 7α,17β-dihydroxy-16α-fluoroandrost-5-ene, 7β,17β-dihydroxy-16α-fluoroandrost-5-ene, 3α,17β-dihydroxy-16α-fluoroandrost-5-ene, 3β,17β-dihydroxy-16α-fluoroandrost-5-ene, 3α,17α-dihydroxy-16α-fluoroandrost-5-ene, 3β,17α-dihydroxy-16α-fluoroandrost-5-ene, 1α,17β-dihydroxy-16α-fluoroandrost-5-ene, 1β,17β-dihydroxy-16α-fluoroandrost-5-ene, 2α,17β-dihydroxy-16α-fluoroandrost-5-ene, 2β,17β-dihydroxy-16α-fluoroandrost-5-ene, 12α,17β-dihydroxy-16α-fluoroandrost-5-ene, 12β,17β-dihydroxy-16α-fluoroandrost-5-ene, 1α,17α-dihydroxy-16α-fluoroandrost-5-ene, 1β,17α-dihydroxy-16α-fluoroandrost-5-ene, 2α,17α-dihydroxy-16α-fluoroandrost-5-ene, 2β,17α-dihydroxy-16α-fluoroandrost-5-ene, 12α,17α-dihydroxy-16α-fluoroandrost-5-ene, 12β,17α-dihydroxy-16α-fluoroandrost-5-ene, 15α,17β-dihydroxy-16α-fluoroandrost-5-ene, 15β,17β-dihydroxy-16α-fluoroandrost-5-ene, 17β,18-dihydroxy-16α-fluoroandrost-5-ene, 17β,19-dihydroxy-16α-fluoroandrost-5-ene, 15α,17α-dihydroxy-16α-fluoroandrost-5-ene, 15β,17α-dihydroxy-16α-fluoroandrost-5-ene, 17α,18-dihydroxy-16α-fluoroandrost-5-ene, 17α,19-dihydroxy-16α-fluoroandrost-5-ene, 16α-fluoroandrost-4-ene-17-one, 7α-hydroxy-16α-fluoroandrost-4-ene-17-one, 7β-hydroxy-16α-fluoroandrost-4-ene-17-one, 3α-hydroxy-16α-fluoroandrost-4-ene-17-one, 3β-hydroxy-16α-fluoroandrost-4-ene-17-one, 4α-hydroxy-16α-fluoroandrost-4-ene-17-one, 4β-hydroxy-16α-fluoroandrost-4-ene-17-one, 6α-hydroxy-16α-fluoroandrost-4-ene-17-one, 6β-hydroxy-16α-fluoroandrost-4-ene-17-one, 11α-hydroxy-16α-fluoroandrost-4-ene-17-one, 11β-hydroxy-16α-fluoroandrost-4-ene-17-one, 4α,17β-dihydroxy-16α-fluoroandrost-4-ene, 4β,17β-dihydroxy-16α-fluoroandrost-4-ene, 6α,17β-dihydroxy-16α-fluoroandrost-4-ene, 6β,17β-dihydroxy-16α-fluoroandrost-4-ene, 11α,17β-dihydroxy-16α-fluoroandrost-4-ene, 11β,17β-dihydroxy-16α-fluoroandrost-4-ene, 4α,17α-dihydroxy-16α-fluoroandrost-4-ene, 4β,17α-dihydroxy-16α-fluoroandrost-4-ene, 6α,17α-dihydroxy-16α-fluoroandrost-4-ene, 6β,17α-dihydroxy-16α-fluoroandrost-4-ene, 11α,17α-

dihydroxy-16α-fluoroandrost-4-ene, 11β,17α-dihydroxy-16α-fluoroandrost-4-ene, 7α,17β-dihydroxy-16α-fluoroandrost-4-ene, 7β,17β-dihydroxy-16α-fluoroandrost-4-ene, 3α,17β-dihydroxy-16α-fluoroandrost-4-ene, 3β,17β-dihydroxy-16α-fluoroandrost-4-ene, 3α,17α-dihydroxy-16α-fluoroandrost-4-ene, 3β,17α-dihydroxy-16α-fluoroandrost-4-ene, 1α,17β-dihydroxy-16α-fluoroandrost-4-ene, 1β,17β-dihydroxy-16α-fluoroandrost-4-ene, 2α,17β-dihydroxy-16α-fluoroandrost-4-ene, 2β,17β-dihydroxy-16α-fluoroandrost-4-ene, 12α,17β-dihydroxy-16α-fluoroandrost-4-ene, 12β,17β-dihydroxy-16α-fluoroandrost-4-ene, 1α,17α-dihydroxy-16α-fluoroandrost-4-ene, 1β,17α-dihydroxy-16α-fluoroandrost-4-ene, 2α,17α-dihydroxy-16α-fluoroandrost-4-ene, 2β,17α-dihydroxy-16α-fluoroandrost-4-ene, 12α,17α-dihydroxy-16α-fluoroandrost-4-ene, 12β,17α-dihydroxy-16α-fluoroandrost-4-ene, 15α,17β-dihydroxy-16α-fluoroandrost-4-ene, 15β,17β-dihydroxy-16α-fluoroandrost-4-ene, 17β,18-dihydroxy-16α-fluoroandrost-4-ene, 17β,19-dihydroxy-16α-fluoroandrost-4-ene, 15α,17α-dihydroxy-16α-fluoroandrost-4-ene, 15β,17α-dihydroxy-16α-fluoroandrost-4-ene, 17α,18-dihydroxy-16α-fluoroandrost-4-ene, 17α,19-dihydroxy-16α-fluoroandrost-4-ene, 3β,17β-dihydroxyandrost-5-ene, 3β-hydroxy-7,17-dioxoandrost-5-ene, 3α-hydroxy-7,17-dioxoandrost-5-ene, 3,17-dioxoandrost-5-ene, 3,17-dioxoandrost-4-ene, 3,17-dioxoandrost-1,4-diene, 3β,7β,17β-trihydroxyandrost-5-ene, 3β,7β,17β-trihydroxyandrostane, 3β,16α-dihydroxy-17-oxoandrostane, 3α,16α-dihydroxy-17-oxoandrostane, 3β,16β-dihydroxy-17-oxoandrostane, 3α,16β-dihydroxy-17-oxoandrostane, 3β,16α,17β-trihydroxyandrostane, 3β,16β,17β-trihydroxyandrostane, 3β,16α,17α-trihydroxyandrostane, 3β,16β,17α-trihydroxyandrostane, 3α,16α,17β-trihydroxyandrostane, 3α,16β,17β-trihydroxyandrostane or an analog of any of these compounds that is (1) 11-oxa substituted or 2-oxa substituted if no double bond is present at the 1-2 position, (2) substituted at the 7-position with an α-halogen, β-halogen, α-hydroxyl, β-hydroxyl or oxo moiety, (3) a D-ring homo analog, (4) a 19-nor analog and/or (5) an analog of any of the foregoing compounds that is substituted with an R^{10} substituent disclosed herein, e.g., wherein the R^{10} is a hydroxyl, thiol, optionally substituted alkyl or a halogen such as fluorine or bromine at the 1-, 2-, 4-, 6-, 9- 11-, 12-, 14-, 15- or 16-positions, wherein the R^{10}, e.g., the hydroxyl, thiol, optionally substituted alkyl or halogen is present in the α-configuration or the β-configuration.

[001023] 30. A method to enhance the healing of a trauma or an acute injury in a subject who has experienced or who is expected to experience a trauma or an acute injury comprising administering an effective amount of a compound to the subject, wherein the compound is (1) 3β,17β-dihydroxyandrost-5-ene, 3β,7β,17β -trihydroxyandrost-5-ene, a 16-halo analog of either compound, a 16-hydroxy analog of either compound, an 11-oxa analog of either compound, a 2-oxa analog of either compound, an ester or a carbonate of either compound, a derivative of either compound that can convert to either compound by hydrolysis or by metabolism or (2) a formula 1 compound of any of claims 1-29.

[001024] 31. The method of claim 30 wherein the subject will experience or has experienced an immune suppressive event within about 2-3 weeks or about 3-4 weeks of the occurrence of the trauma or acute injury, wherein the immune suppressive event is exposure of the subject to an immune suppressive amount of ionizing radiation.

[001025] 32. The method of claim 30 or 31 wherein the ionizing radiation exposure is about 0.3 Gy to about 12 Gy of the ionizing radiation.

[001026] 33. The method of claim 30 wherein the subject has experienced an immune suppressive event within within 3 weeks of the occurrence of the trauma or acute injury, wherein the immune suppressive event is selected from an immune suppressive amount of an immunosuppressive chemotherapy.

[001027] 34. The method of claim 33 wherein the immunosuppressive chemotherapy is an immunosuppressive cancer chemotherapy, an immunosuppressive amtimicrobial therapy or an immunosuppressive glucocorticoid therapy.

[001028] 35. The method of claim 34 wherein the immunosuppressive cancer chemotherapy is treatment of the subject with an immunosuppressive amount of cyclophosphamide, 5-fluorouracil or a platinum compound optionally selected from cisplatin and carboplatin.

[001029] 36. The method of claim 34 wherein the immunosuppressive glucocorticoid chemotherapy is treatment of the subject with an immunosuppressive amount of dexamethasone, prednisone, hydrocortisone or cortisol.

[001030] 37. The method of any of claims 30-36 wherein the subject is a human or a primate.